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BREXIT, ELECTRICITY AND THE NO-DEAL SCENARIO

Perspectives from Continental Europe, Ireland and the UK

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Executive Summary

When it comes to energy and electricity in particular, there can be no winner in the Brexit negotiations. The only reasonable objective should be to minimise losses and avoid trade friction.

Both the United-Kingdom (UK) and the European Union (EU) remain committed to making substantial progress in negotiations and enabling an orderly withdrawal on March 30, 2019, but the prospect of a no-deal or hard Brexit with no transition period looms large on the horizon. While what was once considered an extreme scenario, there is little doubt that energy will continue to flow through the infrastructures that physically connect Great Britain (GB) with the adjacent EU energy systems. Preserving cross-border energy trading, and in particular electricity trading, is in the interest of all stakeholders, be they UK or EU-based, and all efforts should focus on trying to minimize market disruption.

Yet, Brexit risks reversing two-decades of effort in harmonizing rules for cross-border electricity exchanges and could lead to a sub-optimal use of existing interconnectors, while also implying a higher reliance on domestic resources to provide the same energy and system services. The further the EU goes with energy market integration and decarbonisation policy, the greater the likely welfare losses of excluding the UK from the internal electricity market. The isolated nature of the GB electricity system and complementarity between generation mixes and renewables deployment in different Member States is a strong argument for further developing interconnection with the EU27. Backed by these fundamentals, the five most advanced interconnector projects are likely to reach completion in all Brexit scenarios, leading to a two-fold increase in cross-border capacity (from 4 to 9.8 GW by 2023). That said, the regulatory and political context may become more challenging for projects in early development stage, in particular if the contribution of GB interconnectors to security of supply is questioned or where it is considered no longer possible to maintain a level playing field between domestic generators and imported power. As a full member of the EU Internal Energy Market (IEM) with major hydropower assets, Norway may take advantage of the situation and gain stronger EU support for its interconnector projects.

From the perspective of Ireland, if the UK's legal and regulatory framework were to diverge from that of the EU, security of supply and options for decarbonisation of electricity may be adversely affected, while the all-Island electricity market could be fundamentally undermined. A new set of trading arrangement would have to be developed, differing as little as possible from the European target model while being legally and operationally distinct from the EU-wide mechanisms. However, time is of the essence and the less time authorities have to clarify the practical hurdles of implementing new regulatory and governance structures, the more likely the disturbances to markets post March 2019. Looking beyond the immediate impact of Brexit, the case for building a new interconnector between Ireland and France should be refocused, as this project has the potential to increase social welfare in both countries and to improve connectivity of Ireland to the rest of the IEM.

The European energy landscape will be challenged by Brexit, also because of the implication for the UK's likely move to an independent climate policy package. Despite the UK's commitment to preserve a high level of climate ambition, stepping back from all EU climate-related legislation could have a disruptive impact and in particular create legal uncertainty which may slow down actual progress in reducing greenhouse gas (GHG) emissions. The transition to a low carbon energy system will require large levels of new investment to fund a much more capital intensive system and these investments risk being delayed due to the lack of clarity on the civil nuclear oversight scheme, the carbon pricing arrangements and more generally because of the risk perception and the more limited access to public funding. The UK could face tighter capacity margins than anticipated and have to pay a higher price for ensuring its security of electricity supply.

Brexit has no upside for the energy sector and it is both the UK and the EU's responsibility to acknowledge the harsh reality that decarbonisation will be more complex and costlier if EU-UK cooperation is reduced or halted. Energy is a long-term business and effective climate action requires a stable and robust political environment. In this context, clarity on the future terms of any deal is crucial to both mitigate the immediate adverse impacts by developing fall back options to be introduced as soon as the UK becomes a third country, and also to anticipate the inevitable shifts in energy policy strategies.

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Introduction

Europe is in unprecedented territory with the hugely complex Brexit process and less than six months before the UK's scheduled departure from the EU, there is still no divorce deal in sight. Following the Salzburg informal EU Council of 20 September 2018 and the rejection of Theresa May's post-March 2019 proposals ("Chequers proposal")[1], the spectre of a "no deal" Brexit has been increasingly raised. There is now a growing fragility to the whole process, due to seemingly irreconcilable goals and the political instability across both major UK political parties, making consensus building unachievable.

At the heart of the Brexit talks is the necessity for both the UK and EU to navigate towards some sort of new relationship that tries to retain the mutually beneficial aspects of decades of integration but respects the red lines on both sides:

- On the EU side, the stated objective is to retain "as close as possible a partnership with the UK in the future"[2] but the EU also stresses that it cannot confer the same rights and benefits to a non-member of the Union and that a partial application of the EU acquis would give the UK an "unfair advantage" in the single market.[3]
- On the UK side, the emphasis on "taking back control" of British laws suggests that the UK will not participate in decision-making processes within the EU institutions, with no concession on the role of the EU Court of Justice in UK affairs. However, it wants the closest possible economic partnership that allows for frictionless trade in goods.[4]

How all these competing interests can be achieved remains to be seen and thus large uncertainties persist on a range of strategic policy areas, including energy. Many have argued that energy and climate policies should be considered a special case, given the deep integration of energy markets, collaborative institutions and policy mechanisms, and the unanimous calls from UK and EU-based industry bodies to maintain a "dynamic and

1. UK Government, *White Paper on the Future Relationship between the United Kingdom and the European Union*, 12 July 2018, available at: www.gov.uk.
2. Guidelines adopted by the European Council (Art. 50), 23 March 2018, available at: www.consilium.europa.eu.
3. Press Statement by Michel Barnier following the July 2018 General Affairs Council (Art. 50) ; 20 July 2018, available at : http://europa.eu.
4. *Op. cit.* [1], available at: www.gov.uk.

forward-looking cooperation" in an area where "the respective interests of the EU and the UK are balanced".[5] In the Chequers' proposal, the UK Government explicitly sets out its desire to maintain the benefits of the IEM in electricity and gas including the option of continued formal participation in the IEM based on the idea of a common rulebook, and a commitment to the continuation of the Single Electricity Market (SEM) between Northern Ireland and Ireland whatever the outcome of the negotiations. On climate change policy, there is no suggestion of continued cooperation, with a view that the UK already has stronger domestic ambition, implying no need for continued participation in EU policy mechanisms. Yet, the EU is firmly opposed to letting the UK "cherry pick" the benefits of cooperation and thus a "single market *à la carte*"[6], has been ruled out.

Despite their mutual interests, it is fair to assume that the EU-UK cooperation on energy and climate will not be as comprehensive and holistic as it is today, because of the impossibility of having a *sector-by-sector* approach. Given this perspective and without prejudice to the final outcome of the negotiation, this paper develops a long-term vision of the European energy system in a context of weakened cooperation between the UK and the EU27. The interconnectivity between Great Britain (GB) and neighbouring electricity systems, energy supplies to Ireland and the UK's domestic energy and climate policies are assessed in three distinct chapters, emphasizing the different perspectives from Continental Europe, Ireland and the UK on those matters. The objective is to identify the areas where the ending of close continued cooperation would be most disadvantageous to the functioning of markets, new investment in energy infrastructure, system governance and climate policy. Based on this assessment, the paper highlights strategic adjustments that will be needed to mitigate the adverse impact of Brexit over the long term.

5. Letter to Jean-Claude Juncker and Theresa May, "Prioritising EU27/UK Cooperation on Climate Change and Energy", 4 September 2018, signed by British Irish Chamber of Commerce, EDF, Electricity Association of Ireland, Energy UK, Earth Capital Partners, Renewable UK, Unilever, WHEB, WindEurope, Loftbergs, available at: www.e3g.org.

6. T. Escritt and K. MacLellan, "EU's Barnier Offers Britain Close Ties but No 'Single Market *à la carte*'", Reuters, 29 August 2018, available at: www.reuters.com.

Electricity exchanges between Great-Britain and mainland-EU

Regardless of the outcome of the Brexit negotiations, it is highly likely that power will continue to flow though the subsea transmission cables that are physically connecting GB with the adjacent transmission systems of France (FR), the island of Ireland, and the Netherlands (NL). The direction and volume of cross-border (or cross-zonal) flows will continue responding to the relative price of electricity between the markets linked by the interconnectors, generating arbitrage revenues for the trading participants. Currently, GB has four interconnectors of this kind, the oldest being *Interconnexion France-Angleterre* (IFA) commissioned in 1986 and the most recent being the East-West Interconnection with Ireland (IE), commissioned in 2012.

Figure 1: Existing interconnectors linking GB and neighbouring electricity systems

Areas connected	Interconnector	Capacity	Date of commissioning	2017 net flows to GB
FR-GB	IFA	2000MW	1986	+7.1TWh
GB-NL	BritNed	1000MW	2011	+6.9TWh
GB-NI	Moyle	500MW	2001	+0.7TWh
GB-IE	EWIC	500MW	2012	

Source: ENTSO-E Statistical Factsheet 2017.

On both sides of these connecting infrastructures, there will be a strong interest in preserving current trading activities:

- The **owner of the interconnector** would not want to see its costly investment turning into sunk costs because of its inability to generate revenues from selling transmission rights and ancillary services. The merchant interconnector[7] BritNed for instance – connecting GB and the Netherlands since 2007 – costed approximately €600 million and

7. Merchant interconnector projects are not developed by a regulated entity (TSO for example), but rather by private investors. They derive their revenues from selling transmission rights and other services, they are exempted from regulated access charges settings and from rules on the use of congestion rents, and are also bearing all commercial risks (capacity being undersubscribed).

reported €145.7 million of revenues in its latest financial statement for 2017.[8] For all the other GB cross-border interconnectors, whose revenues are subject to regulatory oversight, the potential sunk costs would – at least partially – be recovered from domestic network charges, and thus captive consumers would face higher electricity bills.

- Another strong reason for **consumers** to support a steady operation of interconnector is that they would pay a higher price for electricity if, suddenly, electricity and ancillary services could only be sourced domestically, especially in situations where wholesale electricity prices were cheaper in adjacent markets. Preventing cross-border exchanges would also reduce competition between market players, with a potentially negative impact on electricity bills.
- In addition, **electricity producers** would not want to see their export opportunities being constrained. Because of the isolated nature of the GB electricity system, the Netherlands-GB, France-GB and IE-GB have seen the highest day-ahead price differentials in the EU, over the period 2012 – 2016, and hence this is where trading opportunities are currently the most favorable.[9]
- **Government and regulatory authorities** would also be concerned by the impact on the purchasing power of their domestic consumers and profitability of their domestic industry players. In addition, they would fear security of supply risks as national grid operators could no longer rely on the flexibility provided by interconnectors to cope with imbalances on the system they manage. Since 2015, existing and newly constructed interconnectors are eligible to securing agreements in the GB capacity market and six of them (BritNed, IFA, Moyle, Eleclink, IFA2 and Nemo Link) have been awarded contracts for 2021 and 2022 at the February 2018 auction. With wholesale prices being structurally higher than on the continent, GB is mostly importing electricity from France, the Netherlands and – to a lesser extent from the island of Ireland, but electricity flows can also reverse in tight situations. On 27 and 28 February 2018, when North-West Europe was experiencing a cold snap, GB exported an average of 0.9 GW to France where electricity consumption is more sensitive to temperature variations, due to a higher share of electric heating.[10] Finally, cutting electricity flows at

8. BritNed Development Limited, *Annual Report and Financial Statements for the year ended 31 December 2017*, available at: www.britned.com.
9. ACER/CEER, *Annual Report on the Results of Monitoring the Internal Electricity and Gas Markets in 2016*, October 2017, available at: www.acer.europa.eu.
10. Drax Group and Imperial Consultants, *January to March 2018 Electric Insights Quarterly*, May 2018, available at: http://electricinsights.co.uk.

interconnectors would expose governments to an increase in their domestic CO_2 emissions. As noted by ENTSO-E, flows from France to GB have significantly increased over the 2010-2015 period, largely driven by the closure of coal plants in GB.[11] On a similar note, France's transmission operator, RTE, underlined that the commissioning of the new IFA2 and Eleclink interconnectors will provide more leeway and facilitate the phase out of the remaining 3 GW of coal-fired power generation capacity by 2022, as foreseen by the French government.[12]

For all these reasons and shared interests, Brexit should not prevent cross-border flows of electricity. However, it does bring uncertainty to the future of the electricity trading arrangements between the UK and the remaining 27 EU Member States. An optimal use of interconnectors obviously requires a strong level of legal and operational cooperation on both ends: without membership to the EU internal market, harmonization efforts deployed over the last two decades are now at risk of being reversed.

Post-Brexit arrangements for cross-border trading: potentially substantial efficiency losses

Duty free access to the EU internal energy market is a fair assumption, even in a so-called hard Brexit scenario. In line with the World Trade Organization rules and the "Most-Favoured Nation" (MFN) treatment principle,[13] no discrimination can be made between exports of energy products on the basis of their destination. To the extent EU Member States are not applying import/export duties on the electricity they trade with WTO countries that are not part of any free-trade agreement with the EU –such as Finland with Russia and Spain with Morocco – they would not be allowed to grant the UK less favourable conditions.

That said, grid access charges could be re-introduced, as referred to in the EC's Notice to Stakeholders on Brexit and the Internal Energy Market.[14] Since the adoption of the Commission Regulation No 838/2010, the costs incurred by TSOs for hosting cross-border transit flows on their own networks have been moved to the Inter-TSO compensation (ITC) scheme,

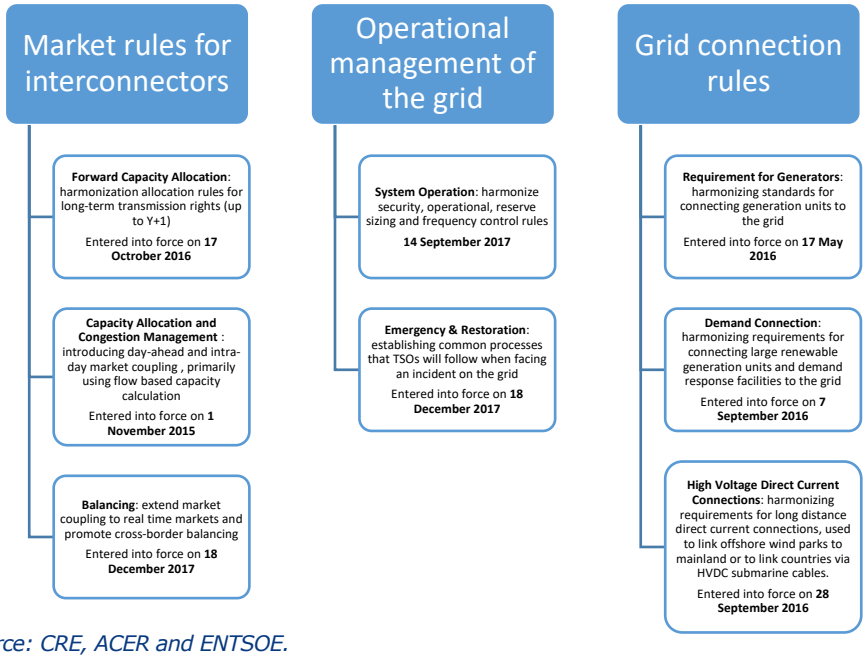
11. ENTSO-E, *Regional Investment Plan 2017 – North Sea*, February 2018, available at: https://docstore.entsoe.eu.
12. RTE, *Bilan prévisionnel de l'équilibre offre-demande d'électricité en France – édition 2017* , Chapitre 4 : « L'analyse sur les cinq prochaines années », available at : www.rte-france.com.
13. Article 1 – General Most-Favoured-Nation Treatment, General Agreement on Tariffs and Trade, available at: www.wto.org.
14. European Commission, "Notice to Stakeholders: Withdrawal of the United Kingdom and the Internal Energy Market", 27 April 2018, available at: https://ec.europa.eu.

to eliminate tariff "pancaking" and avoid distorting cross-border trading. The EC is of the view that "third countries which have not adopted an agreement whereby it is applying Union law", i.e. a non-member of the IEM cannot participate in such scheme, which implies that explicit charges to be paid for scheduled imports and exports could be incurred at the UK borders. In 2016, the ITC Fund amounted to EUR 258.5 million, consisting of EUR 100 million related costs of transmission infrastructures made available for transit flows, and EUR 158.5 million related to transmission losses due to transit. For the same year, the UK's final net position to the ITC Fund was of EUR -10.57 million.[15]

Beyond grid charges, the EC has been very clear on its interpretation of what Brexit means for access rules to cross-border interconnectors; all harmonization measures comprised in the electricity network codes would cease to apply. These network codes governing cross-border exchanges and operational management are the outcome of lengthy technical negotiations amongst European regulators and TSOs, with numerous public consultations, strong oversight by the EC and the involvement of Member States through the comitology process. With preliminary work conducted at the regional level, formal discussions started in 2011 when ACER, the EU regulator, officially took office. Seven years later, all of the electricity network codes and guidelines – eight in total – have been translated into EU law and are in the process of being implemented at all cross-border points.

15. ACER, *Report to the European Commission on the Implementation of the ITC Mechanism in 2016*, December 2017, available at: https://acer.europa.eu.

Figure 2: EU electricity network codes and guidelines



Source: CRE, ACER and ENTSOE.

Agreed rules on products design for different timeframes (forward, spot and real time), allocation platforms, capacity calculation, gate closure times, imbalance settlement periods and pricing (etc.) would no longer cover interconnectors with the UK, creating unnecessary complexity for electricity trading and the need to adapt all related rules such as the operators' licenses, market participants' contracts and the supporting IT infrastructure. In particular, the volume of efficient trades would be reduced if the markets for physical transmission capacity and spot electricity are "decoupled" at the UK-EU borders, as suggested in the EC Notice. First applied on a voluntary basis and now made mandatory by the Capacity Allocation and Congestion Management (CACM) Commission Regulation of 24 July 2015, day-ahead market coupling has increased the percentage of available cross-zonal capacity used in the 'right direction' in the presence of a price differential above 1 Euro, from 60% in 2010 to 86% in 2016.[16] The common day-ahead price coupling algorithm has been used at the GB-FR and GB-NL borders since 2014, and will soon be launched at the GB-NI and GB-IE borders as part of the I-SEM project (see below). In 2016, the "social welfare losses" in the absence of market coupling was estimated at €58.77 million for the GB-IE border, and €45.78 million for the GB-NI border[17], giving a sense of what

16. ACER/CEER, *Annual Report on the Results of Monitoring the Internal Electricity and Gas Markets in 2016*, October 2017, available at: www.acer.europa.eu.
17. *Ibid.*

is to be lost if progress on market coupling is halted or reversed. In practical terms, market operators can easily switch to explicit auctions, which is actually the fallback option if the coupling algorithm fails, but this would remain a suboptimal solution, as it is currently the case at the borders between the EU and Switzerland.[18]

As required by the CACM Regulation and its "target model", market coupling is also being deployed for intraday markets. After the successful launch of ten projects delivering continuous trading with a shared order book across fourteen countries, the "XBID" solution is due to cover most other EU countries in 2019. Intra-day trading becomes crucial as intermittent and less predictable renewable electricity production expands and makes it more complex for market participants to keep their positions balanced. Coupling these markets and therefore increasing the efficiency of trading becomes all the more relevant as European countries pursue ambitious renewable targets for 2030.

The same logic is at play with balancing services: the massive penetration of non-programmable resources requires higher system flexibility and setting up Pan-European cross-zonal balancing markets will help respond to this growing need by using the most economically-efficient resources, and thus lower procurement costs while safeguarding system stability. In line with the Electricity Balancing Commission Regulation of 23 November 2017 and the timelines for implementing the different balancing platforms, several pilot initiatives have been set up, such as the TERRE project focusing on balancing energy from replacement reserves and involving 11 TSOs including GB's National Grid. Although this is still work in progress, preventing the participation of the UK to the future EU balancing markets implies a higher reliance on costlier domestic resources for providing the same services.

In addition, the internal electricity market should be considered as a 'work in progress', because its objective is to harmonize and Europeanize the electricity markets to foster competition, but in a way that will continuously enhance flexibility, decarbonisation and innovation. With all electricity network codes and guidelines having entered into force, the implementation details are now being developed, tested through various pilot projects and eventually refined. In parallel, the EC has submitted a new set of legislative

18. Switzerland has 6010 MW of import and 9810 MW of export capacities with Austria, Germany, France and Italy. Yet, and as explicitly foreseen by Article 1 (4) of the CACM Regulation, market operators and TSOs operating in Switzerland are excluded from the market coupling arrangements for both day-ahead and intra-day as long as there is no implementation of the main provisions of EU electricity market legislation in the Swiss national law and that there is no intergovernmental agreement on electricity cooperation between the EU and Switzerland. Negotiations on this sectoral agreement started in 2007.

proposals, including a revised Regulation on the electricity market design aimed at reinforcing regional cooperation and ensuring higher flexibility in cross-border exchanges. Currently under negotiation, this text will add new EU requirements on the design of capacity mechanisms, on dispatching and balancing responsibility for instance. In fact, the further the EU goes with its market integration and decarbonisation efforts, the higher will be the welfare losses of excluding GB from the internal electricity market.

Brexit creates additional risks for interconnector projects

Similar to harmonized rules and more efficient trading at the UK-EU interconnectors, there is a strong case for enhancing the physical grid connectivity between GB and neighbouring electricity systems. The structurally higher prices on the GB market argue in favour of going beyond the current 4 GW of cross-border interconnection, representing just 4% of the total UK generation capacity whereas the European Council's targets are at least 10% by 2020 and at least 15% by 2030.[19]

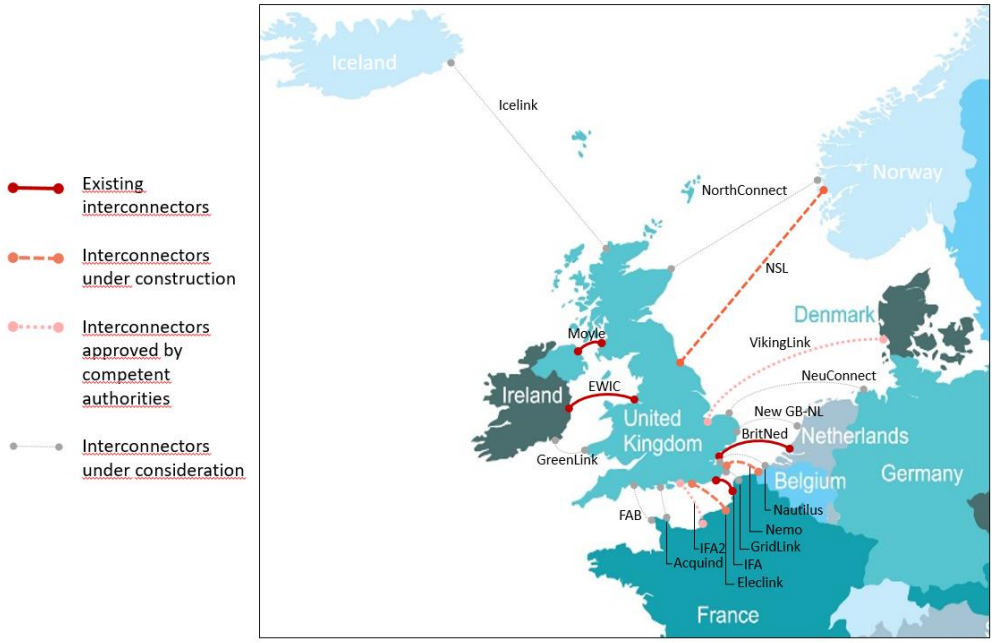
Looking at the UK situation, an increasing electricity demand in the transport and heating sectors,[20] the closure of the remaining coal-fired power plants, the majority of existing nuclear reactors approaching the end of their operational lives by the end of the 2020s and potential delays in building new nuclear reactors, this could actually lead to tight capacity margins and strengthen the case for interconnectors. Beyond security of supply and competitiveness considerations, it is likely that national generation portfolios will remain fundamentally different and interconnectors can contribute to managing renewable power flows in the most cost-efficient way. ENTSOE's latest investment plan for the North Sea regional group highlights strong market exchange opportunities stemming from time differences and the complementarities between the seasonal dispatch patterns of Norway's hydroelectric generation, the hourly variable output of wind generation in GB and Ireland, the mix of solar and wind generation of Continental Europe and the substantial baseload nuclear production in France.[21]

Besides, GB's network operator – National Grid – sees significant wind capacity growth in across all scenarios, the majority coming from offshore wind (from 6.1 GW in 2017 to between 16.8 to 30 GW in 2030 and between

19. European Council, 23-24 October 2014 Council Conclusions, available at: www.consilium.europa.eu.
20. National Grid, *Future Energy Scenarios 2018*, July 2018, available at : http://fes.nationalgrid.com.
21. ENTSOE, *Regional Investment Plan 2017 – Regional Group North Sea*, 2017, available at: https://docstore.entsoe.eu.

21 to 43.4 GW in 2050) and creating challenges in keeping the domestic network balanced and secured. Interconnectors can help compensate for any shortfall in renewable electricity production but will also be increasingly needed to allow surplus output to be exported during periods where supply outstrips what can be injected safely at the domestic level. Thus, all National Grid scenarios point to more storage and interconnector developments. Depending on the speed of decarbonisation and the focus on decentralised solutions, interconnector capacity is expected to go from 3.6 GW to between 9.8 and 19.8 GW in 2030, with no further development beyond 2030 as market saturation is reached and price differentials are not high enough to justify additional investments.[22]

Figure 3: Electricity interconnector projects between Great Britain and neighbouring systems



Source: Ifri based on ENTSO-E TYNDP 2018 projects list.

Yet, interconnector projects cannot go forward without an enabling regulatory and political environment. In recent years and based on the assessment of a net positive impact on social welfare, regulatory frameworks have been adjusted to limit the risk exposure of project developers and facilitate investment decisions in highly capital-intensive projects considered to be in public interest. In 2012, the GB and Belgian energy regulators – Ofgem and CREG – developed jointly the "cap and floor" regime for application to the Nemo project. This regulated model sets a minimum and maximum amount of revenues that interconnectors can earn from their

22. National Grid, *Future Energy Scenarios*, July 2018, available at: http://fes.nationalgrid.com.

commercial operations (capacity bookings, participation in the capacity market or the provision system services to the TSOs). With any shortfall being automatically "topped up" from the national transmissions systems, consumers undertake part of the commercial risk that the project developer faces over the first 25 years of operation. This way, the regulated model becomes a credible alternative to merchant "exemption" that is considered financially risky[23] and for which restrictive legal conditions apply.[24] With the cap and floor regime becoming common practice in North-West Europe, many new interconnector projects have been proposed. Most of them have also been granted the EU label of "Project of Common Interest"[25] (PCIs), which signals EU political support and opens eligibility to fast-track approval procedures and funding through the Connecting Europe Facility.[26]

Figure 4: Interconnectors projects linking GB and neighbouring electricity systems

Areas connected	Interconnector	Capacity	Date of commissioning	Implementation status
BE-GB	Nemo Link	1,000 MW	2019 (Jan)	First project being developed under the cap and floor regime, granted by Ofgem and CREG in 2014. The project has been designated as PCI by the EC. **Installation started** in **summer 2017.**
FR-GB	ElecLink	1,000 MW	2020 (Q1)	In summer 2014, the project was granted a partial exemption from EU legislation by the two regulators, CRE and Ofgem. It has been designated as PCI by the EC and it has received around €600,000 of EU funding through the CEF mechanism, for pre-construction and legal studies. **Construction started in February 2017**.
GB-NO	NSL	1,400 MW	2021 (Sept)	NSL received a positive decision under Cap and Floor Window 1 Initial Project Assessment by Ofgem in 2015. The project has been designated as a PCI by the EC and it has benefitted from a €32M EU funding through the CEF mechanism for technical studies. **Offshore construction started in June 2018** for what is to be the longest sub-sea interconnector in the world (720 km).

23. The full revenue (price & volume) risk is taken by the project developer.
24. Article 17(1) of Regulation (EC) No 714/2009 provides for the possibility of exemptions for new interconnectors from certain requirements of the regulatory framework, in particular if "the level of risk attached to the investment is such that the investment would not take place unless an exemption is granted".
25. Commission delegated Regulation of 23 November 2017 –Union List of Projects of Common Interest ("Union List"), referred to in Article 3(4) of Regulation (EU) No 347/2013, available at: https://ec.europa.eu.
26. Regulation (EU) No 347 (2013) on guidelines for trans-European energy infrastructures.

FR-GB	IFA2	1,000 MW	2020	After a positive initial project assessment in GB in 2015, the IFA2 project was granted a cap and floor regime by CRE in January 2017. Due to Brexit uncertainties, restrictive conditions have been introduced to limit the risk exposure of French consumers in case of cost overruns or underperformance of the new interconnector in the Brexit context. Ofgem delivered its final project assessment and confirmed the cap and floor regime for IFA2 in July 2018. The project has been designated as a PCI by the EC and it has received €5.957 million in EU funding under the CEF mechanism for technical studies. **Financial close and construction start are expected for the end of 2018**.
GB-DK	VikingLink	1,400 MW	2023	VikingLink received a positive decision under Cap and Floor Window 1 Initial Project Assessment by Ofgem in 201. VikingLink was approved by the Dannish Ministry of Energy in October 2017. The project has been designated as a PCI by the EC and it benefited from a €14.824 million EU funding through the CEF mechanism for pre-construction studies and stakeholder engagement. Due to issues relating to UK planning consent, the project is delayed by one year compared to the initial schedule. **Replanning activities are currently ongoing.**
GB-IE	GreenLink	500 MW	2023	GreenLink received a positive decision under Cap and Floor Window 1 Initial Project Assessment by Ofgem in 2015. Element's power grid application for a cap and floor regime is currently under review by CRU and its initial/minded to decision in expected for late September 2018 (based on a public consultation and CRU's cost benefit analysis). Greenlink is a PCI project. Surveys on site began in 2017 and the financial close is expected for Q3 2018.
FR-GB	Acquind	2,000 MW	2022	In December 2017, Ofgem and CRE referred Acquind's exemption request to ACER, due their inability to reach an agreement. Following ACER's decision of 19 June 2018, Acquind's exemption request has been rejected. The project promoter may appeal against ACER's Decision within two months, or alternatively apply for a cap and floor regime. Acquind Ltd plans to commence a marine geotechnical survery in 2018. The project has been granted the PCI status.
FR-GB	FAB Link	1,400 MW	2023	FAB received a positive decision under Cap and Floor Window 1 Initial Project Assessment by Ofgem in 2015. The project has completed its marine geophysical surveys. It is a PCI project and it has received €7.235 million in EU funding through the CEF mechanism for pre-construction studies.
FR-GB	GridLink	1,400 MW	2023	GridLink received a positive decision under Cap and Floor Window 2 Initial Project Assessment by Ofgem in January 2018. It has been designated as PCI in 2018 and the promoter plans to start marine surveys in 2018
GB-NO	NorthConnect	1,400 MW	2022	NorthConnect received a positive decision under Cap and Floor Window 2 Initial Project Assessment by Ofgem in January 2018.NorthConnect has been designated as a PCI by the EC and received €10 million funding through the CEF. The project promoter plans to take its FID in 2019.
DE-GB	NeuConnect	1,400 MW	2023	NeuConnect received a positive decision under Cap and Floor Window 2 Initial Project Assessment by Ofgem in January 2018. Full applications will be submitted to Ofgem and BNetzA in 2019. Project promoters plan to take their FID in 2020.

GB-IC	Icelink	1,200 MW	2025-2030	This project has been designated as PCI by the EC and is currently under consideration.
GB-NL	New GB-NL interconnector	1,000 MW	2030	Project under consideration featuring in ENTSOE's projects list for the 2018 TYNDP
BE-GB	Nautilus	1,000 - 1,400 MW	2028	Project under consideration featuring in ENTSOE's projects list for the 2018 TYNP

Note: Interconnector projects in dark blue are under construction. Projects in light blue have gained regulatory approval by the two competent authorities concerned. Projects in dark grey have been granted a cap and floor regime, in principle, or a positive response to an exemption request (Acquind) by Ofgem, but have not yet been approved by the competent authority in the other connected area. Projects in light grey are under consideration but have not been subject to any regulatory review.

Sources: ENTSOE 2018 TYNDP, EU 2017 PCIs list, Ofgem Project Assessment, ACER Decision on Acquind's exemption request, CRU Consultation Paper on Greenlink, Project promoters' websites.

Taking into account projects approved by both competent authorities and under construction or close to construction start, the UK interconnection capacity is set to more than double by 2023 and reach 9,800 MW. There is now little doubt that the five most advanced projects will reach completion despite Brexit uncertainties. Since the 2016 EU membership referendum, two UK interconnector projects have been approved by competent authorities in EU27 Member States; IFA2 by the French regulator, CRE, in February 2017 and Viking Link by the Danish Ministry of Energy in October 2017. In both cases, some attention was given to the potentially negative consequences on the net social welfare impact of the new interconnectors, but the concerns were not considered sufficiently high and documented to justify putting an end to already well-advanced projects.

The context is obviously less favourable for projects that are still in early development stage, and even less for those under consideration. Following Acquind's request for exemption, CRE issued a Decision on 16 November 2017 stating that it is "not in a position to decide whether any new interconnector project between France and the UK is beneficial to the European community before the withdrawal conditions of the UK from the EU are clarified". As a consequence, none of the three (competing) projects covering the FR-GB border – Acquind, FAB Link and GridLink – will be granted regulatory approval before March 2019 at the earliest. Likewise, the Irish regulator, CRU, launched a public consultation on whether the Greenlink project should be granted a cap and floor regime. In parallel, it is conducting its own cost-benefit analysis including *inter alia* "the potential direct impacts of Brexit on the GB and SEM markets", in particular those relating to "friction and coordination problems between GB and interconnected markets".

Broadly speaking, defining whether a new interconnector project is in public interest is not a straightforward exercise. It requires agreed metrics to quantify benefits and also to take account of non-monetary benefits, while the impacts are expected to occur over several decades, corresponding to the economic asset life of the new infrastructure. Therefore, benefits need to be tested under a range of different scenarios and sensitivities. In addition, some consideration may need to be given to the distribution of impacts on the different stakeholder groups. For instance, Ofgem's cap and floor regime hinges upon a net positive net impact on the UK customer, and not just a positive result at the GB level. Conversely, CRE requires a net positive impact for the EU internal market, and thus assesses whether flows at the interconnectors with other Member States will be modified. In summary, Brexit is adding further complexity into a decision framework that is already subject to many unknowns.

That said, the potential negative impacts of Brexit on the projects' business case could be the following:

- **Project costs** would be higher if UK interconnectors are no longer eligible to the various EU funding mechanisms[27], including the CEF; but also the European Fund for Strategic Investment (EFSI) and the European Structural & Investment Fund. Should the UK leave the EU without any agreement on participation to the internal energy market, there is little chance that UK-based infrastructure projects can retain their PCI status and associated rights. Besides, other projects, such as those aiming at guaranteeing stable supplies to Ireland and a connection to the other EU27 markets, could be regarded as more strategic in the context of Brexit are therefore attract higher funding. Beyond funding, the PCI status implies that the project has political backing from EU institutions. It creates confidence that the project has a high chance of going forward, which can help obtaining favorable financing conditions from private investors.
- As described above, market decoupling and the unraveling of EU harmonization efforts on network management and cross-border exchanges will **impede trading efficiency and restrain welfare gains**. For instance, a recent study on the value of the FR-GB interconnection underlined that the number of hours of saturation of the interconnection would be of 5,500 hours per year (4 GW interconnection capacity) or of 4,800 hours (5.4 GW) in a soft Brexit scenario where market coupling is maintained, but only of 2000 and 1200 hours per

27. Although EU funding opportunities can help attract investment, their volume remains marginal compared to total project costs, and thus should not be decisive. Example: Near €6 million for IFA2, whereas total estimated costs (2016) are of €670 million.

year in hard Brexit scenario with market decoupling.[28] Should the UK be excluded from the inter-TSO compensation fees, explicit charges on scheduled imports and exports would be re-introduced and discourage cross-border trade, though these charges should remain limited if they are only meant to make up for the UK's current €10 million annual compensation.

- Another possibility is that Brexit weakens GB's economic growth potential, translating into lower electricity consumption by 2030 than the 293 to 308 TWh range expected by National Grid in its latest scenarios.[29] In turn, **Great Britain's import needs could be lower** than anticipated, affecting the case for building more interconnection capacity. Yet, as pointed by ACER in its recent Decision on Acquind's exemption request, "policy and macroeconomic risks [...] are rather, normal for this type of electricity projects".

- Brexit could also have an **impact on renewable deployment in the UK**, in particular concerning offshore wind. First, the UK would no longer be bound by EU targets relating to share of demand to be covered by renewable sources. Second, and more importantly, Brexit creates an institutional barrier to a highly coordinated development of the North Sea's significant offshore wind potential.[30] Harmonized tenders, joint projects, and shared grid connection infrastructures could contribute to driving costs further down and accelerate the development of this vast resource. Yet, initiatives such as creating the "North Sea hub", a Pan-European electricity transmission system in North Sea face an additional obstacle on the long road toward consensus building and implementation. In the Artelys study mentioned above, the UK's renewable capacity expansion is 4% lower in the Soft Brexit scenario, and 6% lower in the Hard Brexit scenario, reducing the UK's export potential.

- A fundamental threat could come from **a shift to a more negative approach to interconnectors.** In the UK, it may be argued that overreliance on interconnectors is risky in a post-Brexit context with EU neighbours no longer bound by cooperation and mutual assistance requirements such as the "**solidarity principle**" enshrined in the energy chapter of the Lisbon treaty, or the system operation guideline and emergency & restoration network code. As part of their responses to Ofgem's recent consultation on the socio-economic assessment of new

28. Artelys and Frontier Economics, *The value of the FR-GB interconnection*, October 2017, available at: www.cre.fr.
29. National Grid, *Future Energy Scenarios*, July 2018, available at: http://fes.nationalgrid.com.
30. M. Cruciani, "The Expansion of Offshore Wind Power in the North Sea: A Strategic Opportunity for the European Union", *Études de l'Ifri*, July 2018, available at : www.ifri.org.

interconnector projectors, some stakeholders questioned the contribution of interconnectors to GB's security of supply. For example, InterGen, a GB power producer, underlined that "IFA's extended period of reduced availability in winter 2016/2017 acted to benefit the GB consumer as they were shielded from the price increase that would have resulted from exporting an additional 1GW to the continent during the periods of highest demand".[31] In late November 2016, 4 out of the 8 cables of the GB-FR interconnector were damaged during storm Angus and the capacity was reduced by 50% for most of the winter period. Beyond security of supply considerations, UK producers may ask for a carbon border tax adjustment on imported electricity to guarantee a **level playing field** with domestic generation subject to a carbon price floor.[32] On the EU27 side, similar calls have been made to preserve the "integrity" of the IEM and full regulatory alignment on EU transparency obligations or environmental rules for example.[33] Although these concerns are primarily voiced by private stakeholders with clear interests in favouring domestic production assets, their arguments could reach a wider audience with increasingly divergent rules between the UK and the EU27.

- Finally, competent authorities may also pay attention to the **impact of new interconnectors on different stakeholders' groups**, knowing that benefits are not evenly distributed and tend to favour GB as it is a structural importer of electricity. In its Decision to reject Acquind's exemption request, CRE underlined that the gross welfare surplus created by a new FR-GB interconnector would be relatively low in 2030 for the ENTSO-E area without the UK. In fact, the UK benefits from 70 to 80% of the total collective surplus in 2030, and France is also on the positive side for most of the scenarios. Contrarily, the other EU countries would see their import opportunities from France drop, to the benefit of the UK.[34] On a similar note, building the VikingLink DK-GB interconnector generates gains for the UK consumers and the producers

31. InterGen UK, "Response to Ofgem's public consultation on the initial project assessment for the GridLink, NeuConnect and NorthConnect interconnectors", 11 August 2017, available at: www.ofgem.gov.uk.

32. Energy UK, *Pathways for the GB Electricity Sector to 2030*, February 2016, available at: www.energy-uk.org.uk.

33. For instance, Eurelectric pointed to the Industrial Emissions Directive and the associated Best Available Techniques reference document for large combustion plants. EU generators currently have until August 2021 to comply with the new emissions limits, and it is still unclear whether UK generators will still be subject to this environmental rule post-Brexit and thus exposed to the same cost implications. See Eurelectric, "Brexit: EU-UK Future Energy and Climate Relationship", Eurelectric Position Paper, June 2018, available at: https://cdn.eurelectric.org.

34. Artelys and Frontier Economics, *The Value of the FR-GB Interconnection*, October 2017, available at: www.cre.fr.

from Denmark, Sweden and Northern Germany. Yet, Norway and the Netherlands should experience minor losses because of revenue "cannibalization" on the GB-NL and GB-NO connections.[35] To date, there is no publically available study showing whether VikingLink provides a net positive impact on the ENTSO-E scope without the UK. In addition, no common EU principles have been defined to take account of the distribution of benefits in investment approval processes, leaving room for divergent approaches among competent authorities.

In sum, the direct implications of Brexit should not undermine the fundamentals supporting the increase of GB's connection to neighbouring electricity systems, yet Brexit triggers complex questions on what should be the target model for interconnectivity within the internal electricity market (IEM), and between the IEM and the UK. Today, investment approval procedures are based on rather inconsistent – and thus controversial – approaches. On the one hand, the European Council's 15% target gives a clear direction, but it overshadows the specificities of each border or cross-zonal connection, the actual geography, project costs, market fundamentals and future complementarity between generation mixes that are currently undergoing substantial changes. On the other hand, competent authorities tend to rely increasingly on sophisticated assessments of the investments' business cases and socio-economic impact, but without a full agreement on methodologies, assumptions and decision criteria. In this context, there can be no predictable conclusion of policy makers on the need to go further with the UK interconnector projects, and friction is almost unavoidable. In turn, Norway may benefit from the situation, given its strong hydropower potential which can be complementary to the intermittent renewable production, and its full participation to the IEM through the Agreement on the European Economic Area.

35. Energinet, *Viking Link og 400KV Luftledninger – Business Case Med Faerre Fortroligtholdte Oplysninger*, November 2017, available at: https://energinet.dk.

Ireland's energy supply in a post-Brexit context

Ireland will be the only EU land border with the UK post Brexit, over which its only physical connections for gas and electricity to mainland Europe exist. Previous to the Good Friday Agreement, signed in 1998, the Republic of Ireland/Northern Ireland border was dotted with military checkpoints and watchtowers. Their removal was a symbol of the transformative success of the Peace Process and today the Republic of Ireland/Northern Ireland border it is a frictionless border where people, electrons and gas molecules move freely across.

In its August 2017 position paper on Northern Ireland and Ireland,[36] the UK government noted that negotiations with the EU will need to consider how best to avoid market distortions within the existing single electricity market following UK exit, and ensure that future legal and operational frameworks do not undermine the effective operation of an integrated market. Many in the energy industry in Ireland have expressed concern surrounding the uncertainty that Brexit brings, particularly in relation to the all-island Electricity Market, trade across interconnectors for gas and electricity, and coordinated energy and environmental policy.[37]

To date, energy has received less visibility in the mainstream media on Brexit with negotiations focusing primarily on the agriculture and the food sectors where the impacts of Brexit have already been felt.[38] The Irish government's main stated priorities are centred on the Northern Ireland Peace Process, the Common travel area and the role of Ireland in Europe with energy included in the priority area of Trade and the Economy. While some have warned of black outs[39] in Northern Ireland due to electricity shortages after Brexit, it is believed this is unlikely. Nevertheless, the energy sector in Ireland have expressed a number of key preferences in relation to Brexit outcomes including that the UK's legal and regulatory framework

36. UK Government, *Position Paper on Northern Ireland and Ireland*, 16 August 2017, available at: www.gov.uk.

37. For example, see the webpage of the Electricity Association of Ireland, available at: https://eaireland.com.

38. Ireland saw a decrease of over €500m in food exports alone to the UK in the second half of 2016, due to the fall in Sterling.

39. Adam Vaughan and Nick Hopkins, "No-deal Brexit Could Result in Northern Ireland Blackouts, Leaks Reveal", *The Guardian*, 27 September 2018, available at: www.theguardian.com.

remains consistent with the provisions of the Third Energy Package and existing security of supply (gas) agreements are maintained.

The future of the Irish Single Electricity Market

The administrations in the North and South of Ireland have actively cooperated on energy policy for many years resulting in the establishment of an all-island electricity market and successful operation of critical energy interconnectors between Ireland and Britain.

The Single Electricity Market (SEM) is the wholesale electricity market for the island of Ireland and was developed from the all-island energy project of the North/South Ministerial Council. The SEM was established in 2007 and has been put forward as an "exemplary outcome of the peace-process".[40] It has been operational since then and was the first dual currency market of its kind and unique in combining two separate jurisdictional electricity markets. It is regulated jointly by the Commission for Regulation of Utilities (CRU) and its counterpart in Belfast, the Utility Regulator. The SEM is established in national law in both the UK and Ireland and would remain unaltered in its legal constitution by the UK's departure, as it is primarily the product of concerted co-operation between the energy regulators and government ministers in Dublin and Belfast.[41]

The goal of the SEM is to provide for the least cost source of electricity generation to meet customer demand at any one time across the island, while also maximising long-term sustainability and reliability. The Market has largely been seen as a success in Ireland[42] providing transparent pricing at short-run marginal cost, increasing competition in the market and increasing security of supply.

However, the SEM is changing to adapt to the European Target Model for electricity trading. The creation of the European Single Electricity Market has been a stated aim of the EU in order to promote efficient trading in electricity. The Integrated Single Electricity Market (I-SEM) which is a new wholesale electricity market arrangement for Ireland and Northern Ireland came online on October 1st 2018.

40. SONI written evidence to UK Parliament inquiry into the implications of Brexit for energy security in the UK, available at: http://data.parliament.uk.
41. IIEA, *What Does Brexit Mean for the Energy Sector in Ireland?*, Policy Brief, 2017, available at: www.iiea.com.
42. J. F. Gerald, *A Review of Irish Energy Policy*, ESRI, April 2011, available at: www.esri.ie.

The new market arrangements are designed to enabling the free flow of energy across borders and to integrate the all-island electricity market with wider EU markets. By adopting the EU targets model, each coupled market will implement its own rules based on a standard ex ante trading arrangement and a common price coupling algorithm will schedule flows between geographic regions. This will ensure close to real time electricity trading between regions. Other features of the new market include integrated balancing arrangements that will ultimately enable neighbouring system operators to trade between regions as part of balancing.

The introduction of the new I-SEM market overlaps with Brexit uncertainty. It is the industry's view[43] in Ireland that the best outcome would be for the UK to remain or have access to the IEM. In the absence of this to have a set of trading rules that facilitates electricity continuing to flow in a way that ideally differs as little as possible from the IEM model.[44] To date the language has been positive but uncertainty remains. Prime Minister May, in March 2018,[45] referred to "secure broad energy co-operation with the EU. This includes protecting the single electricity market across Ireland and Northern Ireland – and exploring options for the UK's continued participation in the EU's internal energy market".

However, for I-SEM to remain unaltered, Northern Ireland may have to remain subject to EU law in the field of energy. Any regulatory divergence could create issues for governance and a significant concern centers around the risk of regulatory divergence between structures in Northern Ireland and the Republic of Ireland. Besides, in the absence of the European Court of Justice (ECJ), there will be a need for an alternate dispute resolution mechanism. Despite the UK's commitment to preserve the I-SEM under all Brexit scenarios, and the EU's imperative to guarantee Ireland's energy security, there will be strong legal hurdles in maintaining current trading arrangements and if competent authorities do not have sufficient time to work on the necessary regulatory adjustments (to revert to physical transmission rights for example), then market disruption becomes more likely.

43. EAI, *Position Paper on Brexit*, March 2017, available at: www.eaireland.com.
44. L. Brien, Commission for Regulation of Utilities, Presentation, 16 May 2018, available at: www.europarl.europa.eu.
45. Speech by Theresa May setting out her vision for the UK's relationship with the EU after Brexit, 2 March 2018, available at: www.bbc.com.

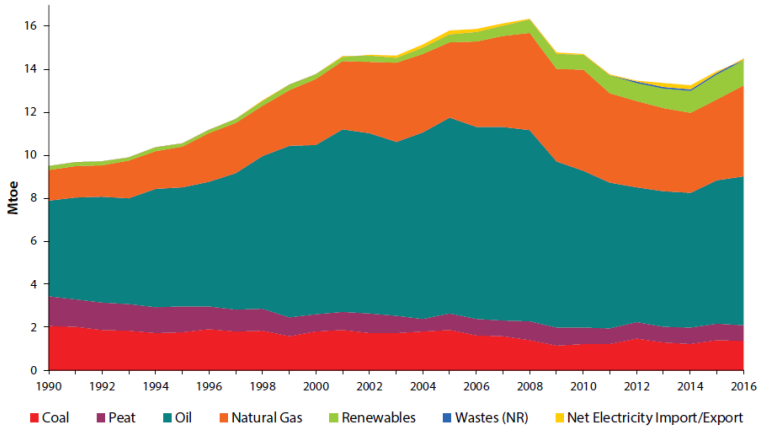
Security of supply considerations

In Ireland, security of supply is coming under increasing political scrutiny, as "Ireland's situation as an island on the periphery of Europe renders it particularly vulnerable to disruptions to the supply of oil, gas or electricity"[46] and the Brexit vote in the UK has refocused political attention on this issue.

Ireland is heavily dependent on energy imports and is one of the most energy dependent countries in the EU importing approximately 85% of its energy in 2014. This reflects the fact that Ireland is not endowed with significant indigenous fossil fuel resources and has only in recent years begun to harness significant quantities of renewable resources and more recently natural gas.

Ireland is dependent on the flow of gas through the British market for its energy and electricity markets. Since the mid-1990s import dependency had grown significantly, due to the increase in energy use together with the decline in indigenous natural gas production and decreasing peat production.

Figure 5: Ireland's Primary Energy Supply by Source (1990-2016)



Source: SEAI Energy in Ireland 2017.

Ireland is connected to GB through two subsea gas pipelines transporting up to 93% of Ireland's natural gas demand, prior to the discovery of indigenous gas. The UK gas hub is an important strategic connection for Ireland as it has access to diverse natural gas sources from indigenous production to Liquefied Natural Gas (LNG) and subsea

46. Taoiseach, *National Risk Assessment 2016 – Overview of Strategic Risks*, available at: www.taoiseach.gov.ie.

interconnector pipelines to Europe, i.e. Belgium, the Netherlands and Norway. If a free trade agreement is not agreed between the UK and the EU before Brexit takes place, there will be a default to World Trade Organisation tariffs. In the case of gas, this would infer a default tariff of between 0% and 0.7%.[47] Yet, as both the UK and EU are net importers of natural gas, it is unlikely either would suggest implementing a tariff. Also the Ireland/UK inter-governmental gas treaty, which was signed in 1993, governs the operation of the interconnectors. This treaty still remains in place today and will remain in place post Brexit.

While recent years have seen a reduction in energy imports due to an indigenous gas field production, this is expected to be short lived. The electricity sector in Ireland is particular dependent on natural gas which produces approximately 50% of annual electricity. Traditionally, Ireland was a net importer of electricity but there was a switch to net exports in 2016 with 700 GWh being exported. This switch is due to a number of factors including the carbon floor price in the UK and reduction in coal fired generation and other capacity constraints[48] in the UK.

Today, there are three electricity interconnectors linking Northern Ireland and the Republic of Ireland (ROI). However, two of these lines are for local support to the network. Due to the limited connection, power flows must be limited across the border to prevent stress on the power grid. Interconnection is critical to long term security of supply and the release of operational efficiencies in the Single Electricity Market. Northern Ireland Electricity Networks (NIE Networks) and Eirgrid have proposed the construction of a new 400 Kilovolt overhead North-South interconnector. The project has received planning approval in both jurisdictions and work on construction is expected to start in 2018, with a three-year construction phase.

Electricity demand in the Republic of Ireland has been growing, and is expected to continue to grow, mainly driven by new large data centres. In ROI there is currently a surplus of generation capacity and this coupled with expanded growth in variable renewables is expected to meet the growing demand. In Northern Ireland, demand is not expected to grow significantly, however, the anticipated closure of some plant due to emissions restrictions will drive the system into capacity deficit after 2020.[49] The commissioning

47. Ervia, Response to the Draft National Risk Assessment, 20 June 2018, available at: www.taoiseach.gov.ie.
48. In 2016 damage to a subsea interconnector to France and the outages of a number of French nuclear plants for inspection reduced the availability of imports into the UK from there.
49. EirGrid Group, *All-Island Generation Capacity Statement 2017-2026*, April 2017, available at: www.eirgridgroup.com.

of the second North South Interconnector with help with this. A briefing to the House of Lords Select Committee on the European Union noted that the "construction of the North-South interconnector on the island of Ireland is vital for reducing consumer costs in both countries, and for maintaining energy security in Northern Ireland".[50] There has been no analysis on the impact of Brexit on projected electricity demand in Ireland however published literature suggests that Ireland will be negatively impacted by Brexit and the level of economic output is expected to reduce across the full economy in most Brexit scenarios.[51] This would likely lead to a softening or reduction in electricity demand.

Status of interconnector projects to GB and France

The proposed Greenlink interconnector would be the third interconnector connecting the island of Ireland and GB (see section 1), while EirGrid are also planning interconnection to France.

There has been no analysis of the potential impact of Brexit on Irish Interconnectors. However in a statement in 2016 the UK grid operator, National Grid said the commercial case for interconnector projects remained strong if Britain remained in the EU's IEM.[52] The Greenlink project is a proposed 500 MW subsea electricity interconnector linking the power markets in Ireland and Great Britain and planned for commissioning in 2023. The project, proposed by Element Power Holdings, is now at an advanced stage of development and it is seeking regulatory approval (see figure 1).

As Ireland's state-owned transmission system operator (TSO), EirGrid is statutorily obliged to explore and develop opportunities for further interconnection. Eirgrid has also undertaken studies and assessments on of potential opportunities for interconnection for Ireland. In 2009, the 'Interconnector Economic Feasibility Report'[53] identified an interconnector with France as one such opportunity. A series of joint studies into the feasibility of the interconnector have been carried out with the French TSO, RTE, since 2011. According to Eirgrid, these studies have indicated that if

50. EirGrid to Brief House of Lords Select Committee on Impact of Brexit, 30 January 2018, available at: www.eirgridgroup.com.

51. A. Bergin, A. Garcia-Rodriguez, E. Morgenroth, D. Smith, "Modelling the Medium to Long Term Potential Macroeconomic Impact of Brexit on Ireland", *The Economic and Social Review*, Autumn 2017, available at: www.esri.ie.

52. RTE, "UK Faces New Risks in Europe Interconnector Plans", 1 July 2016, available at: www.rte.ie.

53. Eirgrid, *Interconnection Feasibility Report*, January 2009, available at: www.eirgridgroup.com.

built, an interconnector between the two countries would be beneficial for electricity customers in Ireland, France and the EU.

Di Cosmo *et al.*[54] examined the welfare impact of the new interconnector from Ireland to France using the European Commission's Reference Scenario as a vision for the 2030 pan EU power system. Results showed that the investment in the interconnector has the potential to reduce wholesale electricity prices in France and Ireland as well as the net revenues of thermal generators. The owners of the new interconnector between France and Ireland many see positive net revenues for the scenarios examined. The impact of the interconnector is more pronounced in Ireland (due to its size relative to the IC capacity) while France is only marginally affected by the new interconnector. Renewable generators in Ireland would see modest increase in net revenues. Importantly, it was found that the project has the potential for a positive impact on welfare in Ireland if low project interest rates are achieved while varying fuel prices has limited impact on welfare for the scenarios examined. Great Britain may see welfare losses associated with the additional interconnection primarily driven by lower net revenues from the existing Irish-British transmission line. A limitation of the study is that only one vision of the future EU power grid was examined.

The European Commission views interconnection as key to a more integrated European electricity system, as it improves the movement of electricity around the system to the places that need it. Interconnection also allows electricity to be exported to markets and users in other countries. The Commission has designated the Celtic Interconnector as a Project of Common Interest (PCI), and has invested €3.9 million to date and up to €4 million has been approved for ongoing and future studies.

Brexit appears to have little impact on the progress of interconnector projects from Ireland to date. It should be remembered that the two proposed projects started well in advance of any Brexit discussions. Yet, a central question is whether interconnection priorities will remain unchanged post-Brexit, in particular in a hard Brexit and no-deal scenario. Given Ireland's strong dependence on the UK for the stability of its energy supplies, one possibility is that the EU27 considers that the Celtics Interconnector is urgently needed to enable the full integration of Ireland in the IEM and preserve the EU Member States from possible disturbances on the UK market. In this perspective, the Celtic Interconnector could benefit

54. V. Di Cosmo, S. Collins, P. Deane, *The Effect of Increased Transmission and Storage in an Interconnected Europe: An Application to France and Ireland*, September 2017, available at: https://papers.ssrn.com.

from a higher political support, and potentially higher financial support from the CEF for example.

Implications for Ireland's Climate Policy

The overall EU objective for 2020, adopted by the European Council in March 2007, is to reduce its greenhouse gas emissions by 20% by 2020 compared to 1990 levels. This is to be achieved through reductions in all sectors of the economy. Reductions through the EU's Emissions Trading Scheme (ETS) are complemented by the individual targets for each EU Member State, established through the 2009 Effort Sharing Decision.

In relation to the targets for 2020, Ireland has an emissions reduction target for each year between 2013 and 2020 under the 2009 EU Effort Sharing Decision. For the year 2020 itself, the target set for Ireland is that emissions should be 20% below their level in 2005. This will be Ireland's contribution to the overall EU objective, which is legally binding.

While representing just under a third of emissions from the energy sector, electricity has been a decarbonising success in Ireland. Under the Renewable Energy Directive 2009/28/EC, Ireland is legally bound to deliver 16% of its final energy requirements from renewable sources by 2020. Ireland has committed to meeting this overall renewable target by achieving 40% renewable electricity, 12% renewable heat and 10% renewable transport by 2020.

Ireland is not on track to meet binding Renewable Energy Targets or binding Emissions Reduction Targets in Agriculture/Transport/Heat (the so called Non-ETS Sectors) for 2020 and is facing the possibility of purchasing allowances for compliance to meet the targets.[55] If the UK cannot commit to EU energy and climate targets, a political decision in the EU may be needed on how to adjust the EU energy and climate targets after Brexit. Analysis undertaken by the Directorate General for Internal Policies[56] investigated a number of methods of redistributing the targets among the remaining EU 27. Under the revised scenario Ireland Renewable Energy 2020 Targets could change by -1% to 2% while Ireland Emissions Reduction Target could increase by +1 to +3%. Given Ireland challenges in achieving current ambition any increase in targets due to Brexit would compound the challenge.

55. RTE, "Missing Climate and Energy Targets Will Cost Ireland Millions", 7 November 2017, available at: www.rte.ie.

56. EU Parliament, AFCO Committee, *Brexit and the European Union: General and Institutional Arrangements*, January 2017, available at: www.europarl.europa.eu.

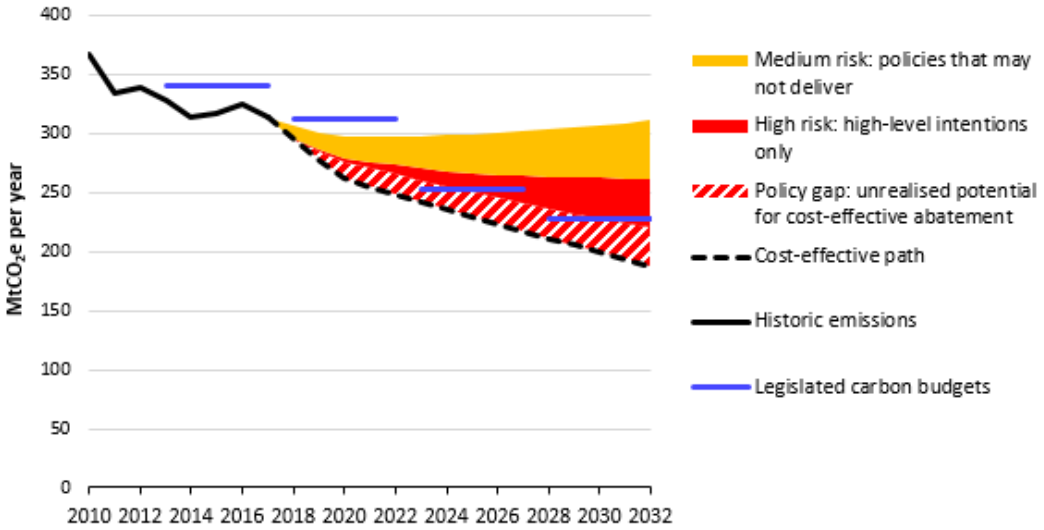
Policy continuity for climate action in the UK

In its White Paper on the future partnership with the EU, the UK sets out the success it has had reducing its emissions, and its higher ambition, seemingly with the purpose of justifying a clean break from the EU in this policy area. However, as reported by the UK Committee on Climate Change (CCC), since 1990, 40% of reductions have been via policies agreed by the UK at the EU level. Going forward, strengthened policies (consistent with EU ambition) could realise 55% of reductions needed to 2030.[57]

The increasing stringency of the UK's emission targets, with an objective of around 60% below 1990 levels in 2030, requires that a comprehensive policy package is put in place, and includes the retention of existing policy mechanisms. This is even more critical, with the latest government strategy suggesting it would miss its 2030 target,[58] and the recent CCC progress report confirming a sizeable policy gap.[59]

57. CCC, *Meeting Carbon Budgets – Implications of Brexit for UK Climate Policy*, October 2016, available at: www.theccc.org.uk.
58. UK Government, *The Clean Growth Strategy - Leading the Way to a Low Carbon Future*, 2017, available at: www.gov.uk.
59. CCC, *Reducing UK Emissions – 2018 Progress Report to Parliament*, 2018, available at: www.theccc.org.uk.

Figure 6: Risks around the delivery of policies to meet the UK carbon budgets from 2010 to 2032 (non-traded sectors)



The chart presents emissions in the 'non-traded' sector only (i.e. sources of emissions not covered by the EU Emissions Trading System – EU ETS), as it is these emissions that determine whether or not a carbon budget is met.

Source: BEIS (2018), Updated Energy and Emission Projections 2017; BEIS (2018), 2017 UK Greenhouse Gas Emissions, Provisional Figures; BEIS (2018), 2016 UK Greenhouse Gas Emissions, Final Figures; HMG & HMT (2009), Building a Low-Carbon Economy: Implementing the Climate Change Act 2008; CCC analysis.

The UK government recognises the "shared interest in global action on climate change and the mutual benefits of a broad agreement on climate change cooperation", yet the possibility of having "a common rulebook on wider environmental and climate change rules" is also explicitly ruled out, suggesting that the UK government would like to deviate from the EU legislation in this field. For instance, the 2017 Clean Growth Strategy mentions the "emerging opportunities to drive more action – for example by putting emission reduction and land stewardship at the heart of a post-EU agricultural support policy".[60] The intention seems to be about developing more cost-effective actions than the ones mandated by the EU, while preserving a high level of ambition. However, stepping back from all EU climate-related legislation could have a disruptive impact and in particular create legal uncertainty which may slow down actual progress in reducing GHG emissions.

60. UK Government, *The Clean Growth Strategy - Leading the Way to a Low-Carbon Future*, 2017, available at: www.gov.uk.

Joint climate policy with the EU

In its 2016 report, the CCC highlighted that EU level mechanisms, strengthened in line with EU ambition, would account for 55% of emission reductions required in the UK by 2030.[61] Alongside others,[62] the CCC have recommended that the UK remain closely aligned with many of the EU level mechanisms, either by staying in the following schemes or replicating them through similar action:

- Product standard measures (vehicle fuel efficiency standards, product standards and labelling, F-gas regulations);
- EU Emissions Trading Scheme (EU ETS);
- Sectoral targets e.g. Renewable Energy Directive, Waste Directive (to reduce landfill);
- Enabling decarbonisation e.g. IEM, research.

A large part of UK climate policy (31% in emissions terms)[63] is directly covered by EU legislation, via the EU ETS. For many years the scheme has faltered due to oversupply of allowances. However, the recent increase in the allowances (EUAs) under the EU ETS, in recent weeks at over €20/tCO_2, and up from €7 this time last year, suggest that the scheme may be starting to show signs of becoming an increasingly cost-effective means of reducing emissions across the EU, as originally intended. A report by the Carbon Tracker Initiative earlier this year suggested the price would increase and if strengthened in line with the Pars Agreement, could see prices increase to €55 by 2030.[64]

It would be unfortunate if the UK, a champion of this type of mechanism, left prior to seeing the benefits for domestic climate policy. But the oversight of the ECJ over the scheme and lack of influence on the rules of the scheme once a non-EU member, could be impossible barriers to surmount. The efforts to establish the EU ETS, and move it to a strong basis for achieving emission reductions have taken many years. Reforms have been agreed to reduce the over-supply in the market, with a key measure, the Market Stability Reserve (MSR) set to come into force in January 2019.

61. CCC, *Meeting Carbon Budgets – Implications of Brexit for UK Climate Policy*, October 2016, available at: www.theccc.org.uk.
62. Green Alliance, *Negotiating Brexit: Positive Outcomes for the UK on Energy and Climate*, July 2017, available at: http://green-alliance.org.uk.
63. UK Government, *2016 UK Greenhouse Gas Emissions*, National Statistics, available at: www.gov.uk.
64. Carbon Tracker Initiative, *Carbon Clampdown: Closing the Gap to a Paris Compliant EU-ETS, 2018, available at:* www.carbontracker.org.

Replacing it with an alternative mechanism would be both costly, and potentially have insufficient market size to achieve the cost-effective mitigation of an EU wide market. Then there is the time it takes to agree on the most appropriate alternative between establishing a UK carbon market, linked with the EU ETS or other carbon markets, or not, but also potentially setting up a single carbon pricing schemes for the whole UK economy by merging the ETS, the UK carbon price floor applying to the power sector and the Climate Change Levy.[65] Once the political direction is agreed, additional time will be needed to define the implementation details and put in place a new way of managing emissions and the legal uncertainty for UK based companies. Remaining outside of the EU ETS, a UK carbon market scheme could of course be linked to the EU ETS, which could allow for continued participation but would still require handing over part of the regulatory control to the EU institutions, as currently envisaged in the draft linkage agreement between the EU and Switzerland.[66]

Ditching other EU mechanisms also bring risks. On the Renewables Energy Directive, while the UK has been effective in pushing renewables in the electricity sector (at 27.9% of annual generation), the transport and heating sectors have lagged (at 4.6% and 7.7% respectively). Overall, renewable energy use stands at 10.2%, against a 2020 target of 15%.[67] The absence of UK policy to push forward renewables in non-electricity sectors means that the loss of this EU framework could reduce visibility of requirement for action here. Energy efficiency promotion through various directives including product standards and appliance efficiency have resulted in large energy and emission reductions and resulted in bill savings for consumers.[68] Finally, emission standards for vehicles remain a key basis for driving fuel efficiency in vehicles and pushing towards low emission vehicles. As shown by the CCC analysis, this could account for a large proportion of future reductions in transport, with EU measures currently accounting for 87% of required emission reductions in this sector by 2030.

On product standards, there are also important reasons for retaining such requirements, as these are also products that the UK trades into the EU market. Certainly the Chequers proposal and the suggestion of a common rule book suggests that the Government is seeking harmonisation on such

65. B. Doda, L. Taschini and V. Druce, *Should the UK Stay or Should It Go? The Consequences of a Divorce with the EU ETS*, LSE Grantham Research, 11 February 2017, available at: www.lse.ac.uk.
66. Agreement between the European Union and the Swiss Confederation on the linking of their greenhouse gas emissions trading systems, Draft legislative act, available at: http://data.consilium.europa.eu.
67. UK Government, *DUKES 2018*, Chapter 6: "Renewable sources of energy", available at: www.gov.uk.
68. CCC, *Energy Prices and Bills – Impacts of Meeting Carbon Budgets*, 2017, available at: www.theccc.org.uk.

standards. However, a sizeable fraction of the conservative party considers continued alignment to be the antithesis of a true Brexit.

In summary, a key worry remains that there will be limited time and resource to focus on developing the required policy package, if indeed the UK withdraws from most of the EU policy mechanisms. The huge increase in the UK civil service, with over 9,000 jobs created to deal with Brexit, suggest the task of managing the Brexit transition is immense.[69] Finding the resource and time to develop the requisite policy package in view of UK climate ambition will be a challenge. A recent example on trying to move measures forward on energy storage highlight the difficulties of making progress during the Brexit process.[70]

The UK's flexibility options post-Brexit

Flexibility in the supply of electricity is considered to be a critical feature of future energy systems, with the operator needing to manage higher levels of intermittent supply and increases in demand due to electrification, including for heating during peak periods. Therefore, interconnection to the wider EU grid is important in view of future changes in the electricity system, allowing for cost-effective flexibility. This is in addition to the benefits of enabling market coupling with other European markets and reducing prices[71] (as described earlier).

A range of analysis have been undertaken that identify flexibility measures as important for decarbonisation. A report by the Carbon Trust in 2016 headlined with the UK being able to save £17-40 billion by deploying flexibility technologies from now out to 2050.[72] This includes interconnectors playing a role alongside demand side response and storage technologies. Other studies concur with these insights.[73] The role is particularly important post-2020 when level of renewables increase. The analysis highlights that the current pipeline of interconnection is optimal but that delay to these projects would increase cost due to the deployment of costlier flexibility options. Furthermore, the increased ambition of

69. IFG, *Costing Brexit: What Is Whitehall Spending on Exiting the EU?*, March 2018, available at: www.instituteforgovernment.org.uk.
70. Energy Storage News, "UK Government Says 'Brexit' Is to Blame for Stalled Progress on Energy Storage", 25 May 2018, available at: www.energy-storage.news.
71. Vivid Economics, *The Impact of Brexit on the UK Energy Sector*, 2016, available at: www.vivideconomics.com. See also : D. M. Newbery, G. Strbac and I. Viehoff, "The Benefits of Integrating European Electricity Markets", *Energy Policy*, No. 94, 2016, pp. 253-263, available at: https://doi.org.
72. Carbon Trust & Imperial College, *An Analysis of Electricity System Flexibility for Great Britain*, 2016, available at: https://assets.publishing.service.gov.uk.
73. Imperial College & NERA, *Value of Flexibility in a Decarbonised Grid and System Externalities of Low-Carbon Generation Technologies*, on behalf of the CCC, 2015, available at: www.theccc.org.uk.

electricity sector decarbonisation would push the benefits of flexibility including interconnection even higher. In 2030, a high wind case meeting a decarbonisation target of 100 gCO_2/kWh versus one meeting 100 gCO_2/kWh would see annual savings of around £5 billion compared to almost £8 billion.[74]

A further 5.8 to up to 17.1 GW of interconnection is planned to be added between the UK and European neighbours adding to the 4 GW already in place. Most of the analyses cited above highlight that what is in the pipeline should be sufficient to provide the necessary flexibility, alongside other options. The question is whether Brexit could undermine the investments, and create delays. In the guidance note on implications for the Connecting Europe Facility (CEF) in the event of a no deal,[75] the Government has stated that it will provide the funding of any funding under CEF, providing assurance to developers who are accessing this funding for interconnector projects. The projects that are in the pipeline are crucial for the increased capacity needed, and government should endeavour to ensure that investments are still attractive. This is of course tied to the eventual agreements on the UK's access arrangements to the IEM. If the political environment becomes more challenging for cross-border interconnection projects, the UK would have to rely on costlier domestic resources to provide flexibility and guarantee its security of electricity.

Arrangements for nuclear governance

From an emission reduction perspective, the UK's nuclear industry considers that it has an important role to play in providing low carbon electricity. Recent government projections suggest that this could be the case, with the sector estimated to be providing 31% of the UK's electricity in 2035 (compared to 52% from renewables).[76] This sizeable contribution is based on additional capacity of 13 GW, including the 3.2 GW Hinckley C project scheduled to be generating by 2025. However, it is fair to say that the industry has been struggling in recent years to demonstrate that it can provide a cost-effective route for decarbonisation of power generation. A report by the National Audit Office (NAO), which scrutinizes public expenditure for Parliament, stated that Government's Hinckley deal had

74. Poyry & Imperial College, *Roadmap for Flexibility Services to 2030*, on behalf of the CCC, 2017, available at: www.theccc.org.uk.
75. UK Government, BEIS, *Connecting Europe Facility Energy Funding if There's No Brexit Deal*, 2018, available at: www.gov.uk.
76. UK Government, BEIS, *Updated Energy and Emissions Projections: 2017*, 2018, available at: www.gov.uk.

committed consumers and taxpayers to a high cost and risky deal due to cost overruns and project delays.[77]

As early as February 2017, the UK Government clarified that triggering Article 50 would imply leaving the Euratom treaty to which the UK became a member in 1973, for the reason that Euratom and the European Atomic Energy Community (EAEC) are governed by EU institutions, including the European Commission and the ECJ. There is no question that the UK will establish some sort of governance regime for civilian nuclear activities, covering nuclear safeguards, the ownership and movement of nuclear material, equipment and technology, the management of spent fuels and radioactive waste.[78] Having such regulations in place is a security imperative for the UK, an obligation under international law on non-proliferation, and also a credibility requirement for trading with other countries involved in the global nuclear industry.

In the context of the preparations for a "no-deal" scenario, a Nuclear Safeguard Act was passed into UK law in June 2018, clarifying that the UK's Office for Nuclear Regulation would be in charge of the new domestic safeguards regime – instead of Euratom – as of March 2019, should there be no negotiated outcome with the EU and formal association agreement with Euratom. The draft safeguards regulation was submitted to public consultation during summer 2018. Discussions are also ongoing between the UK and a number of third countries to replace the nuclear cooperation agreements to which Euratom is a party, and this way ensure that civil nuclear trade with the UK is not interrupted. Despite the plans put in place, leaving Euratom without adequate provision has come up against many concerns, from industry[79] and parliamentarians[80] – and it remains to be seen how rapidly and smoothly the new governance provisions can be put in place, and whether there will be any negative impacts which could slow any progress in the development of new projects (in addition to Hinckley C). Reacting to the recent publication of the government's "no-deal" technical notice on nuclear regulation, the UK Nuclear Industry Association (NIA) underlined "the scale of the work still required to put contingency plans in place before March 2019" and stressed that the more general post-Brexit

77. NAO, *Hinckley Point C*, 2017, www.nao.org.uk.
78. UK Government, BEIS, *Guidance on Civil Nuclear Regulation if There's No Brexit Deal*, 23 August 2018, available at : www.gov.uk.
79. Foratom, *The Brexit Impact on Nuclear Energy*, 2017, available at: www.niauk.org.
80. "Brexit: Ministers Suffer Nuclear Defeat in Lords", *BBC News*, 20 March 2018, available at: www.bbc.co.uk.

arrangements on movement of people, goods and services were also "essential to civil nuclear".[81]

Then there is the research and training collaboration, with a €1.6 billion budget envelope for the implementation of the Euratom Programme over the 2014-2018 period (2019-2020 extension currently under discussion), of which €728 million are allocated to fusion research,[82] including the International Thermonuclear Experimental Reactor (ITER) project in which many UK researchers, companies and institutions are involved. The Joint European Torus (JET) research project, based at the Culham Centre for Fusion Technology in the UK, is also funded to the tune of €60 million and the extension of its operating contract until 2020 is currently envisaged by the European Commission, although a final decision is still pending. The UK government recently expressed its willingness to "discuss options to keep JET operational until the end of its useful life"[83] even in the case its EU operating contract is terminated by 2020 and the EU's 87.5% cost coverage ceases to apply, but. it is unclear where future funding for this initiative will be sourced.[84] It is this research collaboration under Euratom that the UK has signalled they would like to remain in "as part of an ambitious science and innovation accord", despite a formal withdrawal from Euratom as a whole.[85] The draft Withdrawal Agreement of 19 March 2018 also confirmed that the UK would continue to take part in all EU programmes, including the Euratom research programme, over the rest of the 2014-2020 financial framework. Yet, this would only be possible if a final agreement is secured by March 2019.

Risks to new investment in the UK electricity sector

The transition to a low carbon energy system will require large levels of new investment to fund a much more capital intensive system. For the electricity sector, new investment levels in the region of £200-300 billion will be needed by 2030 (Blyth et al. 2014).[86] Two key risks emerge; firstly, will the

81. UK NIA, *NIA Responds to the No Deal Technical Notices Published by Government*, Press Release, 23 August 2018, available at : www.niauk.org.
82. Council Regulation (Euratom), No. 1314/2013 on the Research and Training Programme of the European Atomic Energy Community (2014-2018), available at: http://ec.europa.eu.
83. UK Government, BEIS, *Guidance on Nuclear Research if There's No Brexit Deal*, 23 August 2018, available at: www.gov.uk.
84. *Brexit Uncertainty Threatens Fusion-Energy Research*, Nature, May 2018, 557(7707):611. doi: 10.1038/d41586-018-05283-x.
85. UK Government, *The Future Relationship between the United Kingdom and the European Union*, available at : www.gov.uk.
86. W. Blyth, R. McCarthy and R. Gross, "Financing the UK Power Sector: Is the Money Available?", Energy Policy, No. 87, 2015, pp. 607-622.

UK be an attractive place to invest during and after the Brexit process. Secondly, the EU constitutes an important source of funding; if the UK can't access this will it be available from alternative sources.

On the first point, this will of course depend on the outcome of the negotiations. If the outcome is a no deal, investment in new projects will more likely be put on hold, with investors holding back while the dust settles. This could also impact on the cost of capital, if indeed investors view new investments as more risky.[87] If the UK remains fairly well aligned, with an agreement that keeps energy systems aligned, the uncertainty will be much lower. From a policy perspective, depending on the project type and in which sector, the lack of certainty or development in climate policy (as discussed earlier in this section) could also undermine investment.

Secondly, the EU is an important source of funding for climate and energy sector investment, particularly for less mature technologies. A report by Chatham House highlights some of the sources of funding that may not be accessible post-Brexit.[88] For example, the UK holds a 16% stake in the European Investment Bank (EIB), and received a total of €31 billion in the periods 2012-16, with almost 30% going to the energy sector. There is a question as whether the UK could keep its stake from outside of EU and retain preferential lending terms. Other important funds include the European structural and investment funds and the European Fund for Strategic Investment, the latter which has provided the UK with €8 billion, with 25% going on energy projects. Finally, as mentioned above, the UK is involved in €200 million worth of projects of common interest under Connecting Europe Facility, which the UK Government says it will underwrite in a no deal scenario.

There is a real risk that cooperation with wider Europe on energy and climate policy will be hugely reduced post-Brexit. This comes at a time when the UK needs to further develop its climate policy package to drive down emissions further, particularly across non-electricity generation sectors. Leaving key EU policy mechanisms such as the EU ETS, reducing flexibility by moving to partial integration with energy markets, and increasing uncertainty for investors is all going to make the mitigation challenge more difficult. Continued alignment with EU energy and climate policy, to the extent to which this can be negotiated, would be an important objective to help the UK meet its climate goals both in the near and longer term.

87. Vivid Economics, *The Impact of Brexit on the UK Energy Sector*, 2016, available at: www.vivideconomics.com.
88. Froggatt *et al.*, *Staying Connected: Key Elements for UK-EU27 Energy Cooperation After Brexit*, May 2017, available at: www.chathamhouse.org.

Conclusion

After decades of efforts to remove obstacles to energy trading, and at a time when the expansion of renewables is strengthening the case for integrated markets, Brexit will create unnecessary complexity and uncertainty for market players, and prevent Europe as a whole from following the most cost-efficient decarbonisation pathway.

If the UK develops increasingly divergent environmental regulation or is not bound by the same security of supply and cross-border cooperation obligations, a full access to the EU IEM does not seem possible. In this context, alternative sub-optimal arrangements would have to be developed rapidly to minimise market disruption. In the longer term, the EU and the UK may also need to re-think their strategy in relation to the further development of electricity interconnection with Great-Britain, with the dual objective of retaining the evident cross-border trading opportunities that Brexit does not eliminate, while ensuring that all Member States adopt a consistent approach toward new infrastructure developments with the UK and that a level playing field is maintained between domestic generation and imported power.

Preserving stable energy supplies to Northern Ireland and Ireland is an absolute imperative and will require both the UK and the EU to make compromises on their respective red lines. Ireland may need to be exempted from the full implementation of EU third energy package rules, if it is not compatible with preserving the all-Island electricity market (SEM) and, likewise, the UK may need to accept some degree of EU legislative interference as the Irish electricity market should not be excluded from the European-wide integrated electricity markets. In the longer-term, Ireland and the EU should consider accelerating progress on the development of a direct connection between Ireland and France, as a way to ensure that Ireland benefits from the further development of the IEM.

Finally, the EU and the UK should consider developing a new cooperation framework for climate action. Despite the argument that the UK's targets are currently more ambitious than those in place at the EU level, alignment with EU policies and mechanisms ensures a "double lock" in environmental legislation and provide higher certainty for investors. Climate action goes beyond the "mutual benefits' of the negotiating parties and it must become a decisive factor in shaping the future energy relationship between the UK and the EU.

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